

## CLAIMS

What is claimed is:

1. A method of PROTO implementation in MPEG-4 comprising the steps of:  
 defining a PROTO object class;  
 5 instantiating a PROTO object;  
 calling said PROTO object into an MPEG-4 scene graph; and  
 rendering said PROTO object.

2. A method according to claim 1 wherein said defining step comprises:  
 10 defining said class by inheriting said class from MediaObject;  
 defining in said class a variable representing an array of NodeField\* objects;  
 inserting PROTO fields into said array of NodeField\* objects;  
 defining in said class a variable representing an array of BifsFieldTable structures;  
 inserting descriptions of said PROTO fields into said array of BifsFieldTable  
 15 structures;  
 overloading GetFieldCount, GetFieldTable and GetField methods of said PROTO  
 class;  
 locating PROTO field objects;  
 defining in said class a variable representing an array of pointers to said  
 20 MediaObject;  
 inserting at least one PROTO code node into said array of pointers to said  
 MediaObject;  
 defining in said class an array of pointers to routes;  
 inserting at least one PROTO code route into said array of pointers to routes;

linking at least one PROTO code ISed node field to a corresponding PROTO interface field by a route object;

linking at least one IN parameter to a node field by a route object;

linking at least one OUT parameter to a node field by a route object;

5 linking at least one IN/OUT parameter by two routes, one for each direction; and adding any of said routes to a field of said PROTO object.

3. A method according to claim 1 wherein said instantiating step comprises:

cloning an original PROTO object;

10 cloning each node field of said original PROTO object;

returning a pointer to said clone object;

copying the value of each of said node fields to a NodeField object;

cloning a route that connects two of said node fields between a source node and a target node;

15 cloning at least one interface field object of said original PROTO object;

storing said cloned interface field objects in said clone object;

cloning at least one PROTO object node;

cloning at least one PROTO object route; and

returning a pointer to the clone PROTO.

20 4. A method according to claim 1 wherein said calling step comprises:

overloading either of the -> operator of SFGenericNode and the [] operator of MFGenericNode of said PROTO object; and

if the node that is pointed to is a PROTO instance, returning the address of the first node of said PROTO object's PROTO code.